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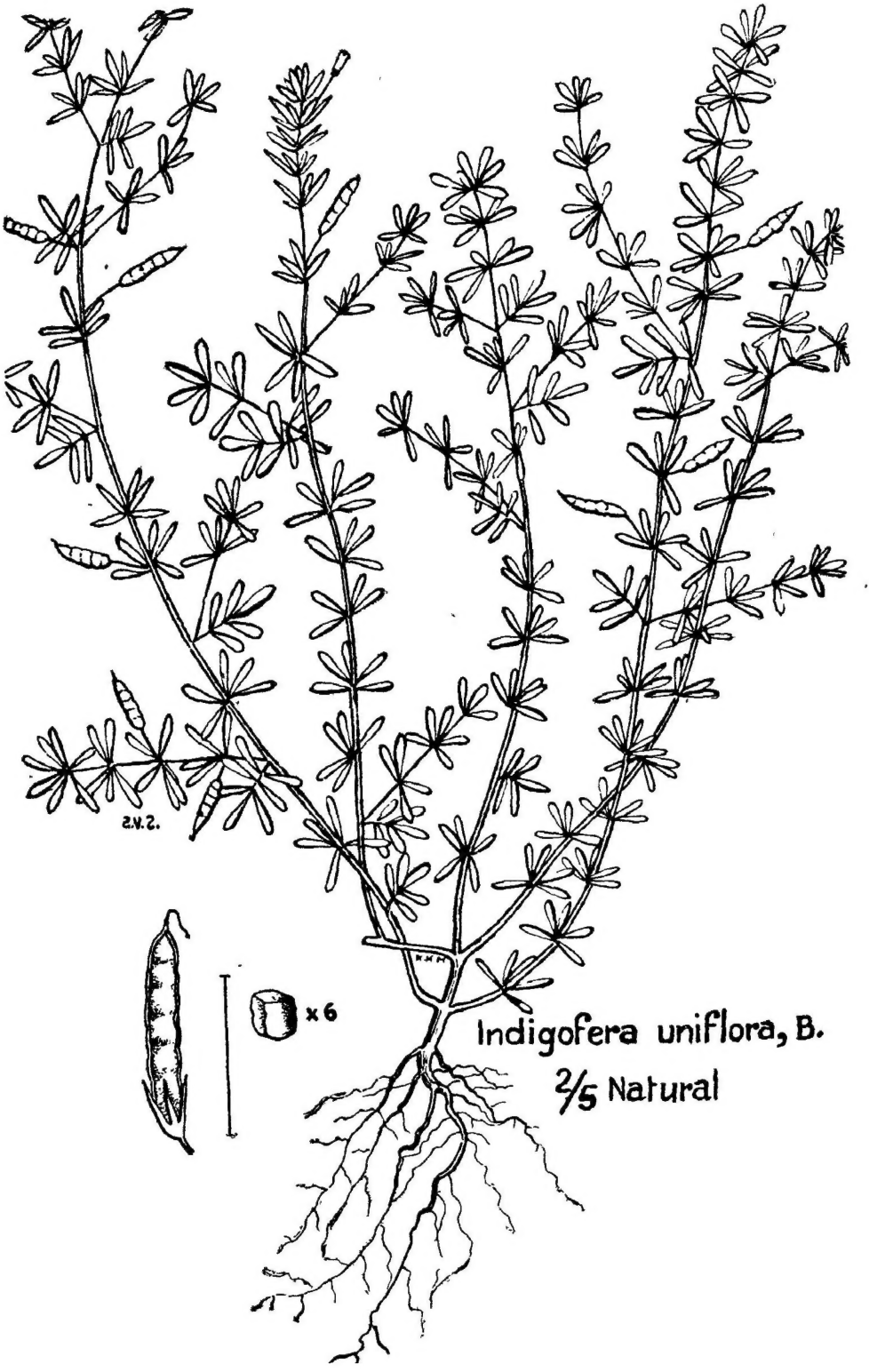
Editorial

Auxiliary Foods: Sir S. V. Ramamurty in the course of his address at the 33rd College Day and Conference remarked that while all cereals are foods all foods are not cereals. This calls our attention to those non-cereals which could be used as food stuffs. Most of these are already being consumed in one way or the other. Cereals give both bulk food and nutrition. Any substituted food must have these properties. The only crops that have near-cereal properties are the root crops like potatoes, taros, sweet-potatoes etc. The root crops have sometimes other ingredients than starch which may render them more balanced and in others less so. The other vegetables contain up to 75% or more of water and hence can only be adjuncts to basic foods like cereals, or meat. The cereals by their nature have several advantages over non-cereals. Though small in size the cereal grains certain only a fractional part as water and can be stored unharmed for a number of years. Dessication does not affect them much and storage is easy. The non-cereals are bulkier, contain more water and are more easily susceptible to pests, diseases and shrinkage due to dessication. Hence in its wake the near-cereal food stuffs, unless specially prepared, cannot be stored and therefore, raise the other problems of marketing etc. Palatability and adapatibility to different preparations of dishes are other points to be tackled. In *taros* and *dasheens*, etc., there are varieties which are not acrid. These however, are not widely known. Their importation, distribution and inducement for cultivation should be attended to. With all

these they form merely food adjuncts. Larger quantities of boiled potatoes conld be consumed with a meat dish but neither potatoes nor sweet potatoes can wholly substitute the main food. Herein comes the psychology, the skill of the chef and the housewife to adjust the menue in such a way as to minimise the consumption of cereals.

Alysicarpus vaginalis, DC.

Zornia diphylla, Pers.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Indigofera uniflora, B.
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Three Useful Pasture Plants

By

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(Received on 4—5—1950)

Food for cattle is next in importance only to food for man, for without healthy livestock, agriculture cannot thrive. There are many fodder plants and grasses which can be cultivated for purposes of producing fodder. But the area that can be devoted to such cropping can only be limited in view of the shortage of food grains in the country, and most available land has to be utilized to grow food crops. Therefore, it naturally follows that our grazing grounds have to be improved and enriched by encouraging the growth of not only grasses but also pasture plants particularly those belonging to the legume family.

During the study of the weed flora of South Kanara district, the author of this note has come across three leguminous plants thriving well under local conditions and much relished by cattle. Though they are recorded in the Flora of the Presidency of Madras by J. S. Gamble, their use as pasture plants does not seem to have been brought out by previous workers. With a view to bringing them to the notice of the public interested in the subject and to encourage their spread in new areas this note is published. The three species mentioned here do not seem to be well known and a short description of the plants with their local names where available and figures are included so as to enable the readers to identify the plants in the field and collect the seeds for multiplication.

1. **Indigofera uniflora:** Buch-Ham, Kan — *Kadu-neeli*. It is a herbaceous, hardy plant, gregarious in protected areas. Branches are long, slender, rather wiry and prostrate, the tips ascending, and red in colour. Leaves are small with 3 — 7 narrow leaflets. Flowers are red, small and solitary; pretty to look at when the plant is in bloom. Pods are slender about $\frac{1}{2}$ inch long on erect thread-like stalks. Seeds small, brown, smooth, $1\frac{1}{8} \times 1$ mm.

The plant is found in pastures and wastelands of the West Coast and also parts of Coimbatore district during the rainy months and is in flower or pod from September — December. Even in poor sandy soils, the plants come up well on account of its deep-seated root system. Cattle relish it well and it has good nutritive value. At the Agricultural Research Station, Kasaragod, a self-sown but manured plot (sandy soil)

gave a calculated acre yield of 5,850 lbs. of green stuff, when cut in flower (Reports on the work of Agricultural Research Stations in Madras Presidency 1940-41. p. 417).

2. **Zornia diphylla:** Pers. Mal — *Nelam Mari.* It is a low diffuse herb with wiry branches, bi-foliate, succulent leaves having characteristic pairs of leaflets which are narrow and about an inch long, and gland-dotted. Flowers small, yellow in short recemes and with lance-shaped persistent bracts. Pods jointed, with dark brown, soft spines. Seeds are very small about 2 x 1½ m.m., brown, smooth and pitted.

The plant is common in all the coastal districts and inland up to about 3,000 feet., and found gregarious in dry situations even on rocky soil and roadsides. Specimens in richer soils are more robust with larger leaves. The plant is nutritious and much liked by cattle, and said to be particularly good for milch cows. Under favourable conditions a yield of 3,000 lbs. of green stuff can be expected. Mention of this plant as a good forage plant was first made in the Agricultural Station Reports for 1940—41. p. 418.

3. **Alysicarpus vaginalis,** DC. Tam. *Namappoondu.* A low herb, much branched, the long wiry branches, radiating and spreading on the ground from the top of a rather deep-going tap root. Flowers are small, pink, in short, dense, terminal recemes. Pods nearly round, about an inch long, falling off in bits — each bit containing small, smooth brownish yellow seed 2 x 1½ m.m.

The plant is found in all the districts of both the coasts, in pasture lands from September — December. It thrives well even in sandy soils. Under protected conditions about 3,000 lbs. of green stuff can be obtained from an acre; it is eagerly grazed by cattle.

All the three species mentioned in the note belong to family *Leguminosae, Papilionaceae* and enrich the soil were they grow. It is therefore highly desirable that these plants are encouraged to grow and thrive in all pasture lands. The main reason why they are not found in abundance in our grazing grounds is that grazing is not restricted in our pasture and cattle have a tendency to graze down the plants so that flowering and seeding are affected. With a view to ensuring a supply of seed for the following season the last flush in November may be left unaffected by cattle. The seed may be sown along with grass seed and a cultivator worked.

The following are the analyses of the plants by the Government Agricultural Chemist, Coimbatore.

—		Indigofera uniflora	Zornia diphylla	Alysicarpus vaginalis
		(1)	(2)	(3)
Moisture	...	9·56	10·11	8·97
Ash	...	5·49	10·48	6·75
Crude protein	...	12·26	15·78	13·30
Ether extractions	...	2·46	1·32	1·96
Crude fibre	...	40·52	30·50	38:00
Carbohydrate	...	29·71	31·81	31·02
Insolubles	...	1·36	4·94	1·06
Phosphoric acid (P_2O_5)	...	—	0·42	0·36
Lime (CaO)	...	—	1·13	1·41
pH	...	—	—	6·19
Albuminoides	...	8·06	14·57	—

Government Agricultural Chemist's remarks:

No. 1—*I. uniflora:* The leaves contain good quantities of protein and have good feeding value. They are, however, acid in reaction. The feeding of unlimited quantities may cause digestive disturbances.

No. 2. *Zornia diphylla:* The plant is a good fodder plant.

No. 3. *A. vaginalis:* The sample has a fairly good feeding value.

It will be seen from the analyses that the plants are nutritious and will be an asset to any pasture land. Seeds, however are not available with the author at Coimbatore, and have to be collected by interested persons, from the fields in the coastal districts and multiplied for sowing. In case of doubt regarding the identity of the species, specimens may be sent to the Government Lecturing & Systematic Botanist, Lawley Road P. O., Coimbatore and he will be pleased to name them free of cost.

The author's thanks are due to Sri S. N. Chandrasekhara Ayyar, Government Lecturing & Systematic Botanist, Coimbatore for his valuable suggestions given during the preparation of the note, and for the loan of the plate reproduced here.

Viability of Some Grass Seeds

By

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Seeds form the first and foremost basis for successful farming. They must be of superior quality, free from mixtures of other crop plants, varieties, strains and weeds, free from mechanical impurities, diseases and pests. While satisfying the above needs of good quality seed, the next most important point is that every seed sown should sprout and grow into a plant i e. it must be viable. If they are poor in germination there will be gaps formed in the field and the yields will consequently be low. So it is very essential to have viable seeds for sowing purposes. The germination capacity of seed are affected by the environmental conditions at the time of the seed setting and formation, stage of harvest, methods of storage and period of storage. The present paper gives a preliminary report of the viability of a few grass seeds under different periods of storage.

Initial germination capacity: Seeds of some of the cereals and most of the grasses in general do not give cent percent germination even in the first year of collection. Millets have the highest initial germination percentages ranging from 92–98 except cholam which has 85% of germination (4). Some grasses give 70 to 80% germination and many give even less. The seeds of fodder grasses tested in the laboratory gave the following figures (Vide Table I). The seeds were stored in thick brown paper bags. The testing was done by soaking the seeds for 2–3 hours in water, then arranged on blotting paper on germination trays and kept at room temperature, as described in a previous paper (2). A single spikelet as an unit is considered as 'seed' in this paper.

TABLE I

Germination percentages of the seeds of a few species of grasses:

Species	Germination percentages			
	I year of Storage	II year of Storage	III year of Storage	IV year of Storage
1. Panicum antidotale, Retz (Australian drought-resistant grass)	55—70	Continued to give 60—65% for 6 years.		
2. Enteropogon monostachyos, Schum.	75—80	58—78	65—67	35—38
3. Iseilema laxum, Hack. (Chengali gaddi)	36—48	18—20	8—10	Nil

Species	Germination percentages			
	I year of Storage	II year of Storage	III year of Storage	IV year of Storage
4. Cenchrus ciliaris, L. (Kolukattai grass)	35—39	32—46	5— 9	Nil
5. C. setigerus, Vahl. (Black Kolukattai)	8—11	2— 8	2— 4	Nil
6. Chloris bourneii, Rang. & Tad.	23—30	10—25	8—10	Nil
7. Sehima nervosum, Stap. (Nendra gaddi)	17—26	16—24	6—14	1— 8
8. Andropogon pumilus, Roxb.	22—32	24—32	20—22	3— 5
9. Eremopogon foveolatus, Stapf.	8—10	3— 5	Nil	Nil
10. Dichanthium annulatum, Stapf.	8—10	4— 6	3— 4	Nil
11. Pennisetum polystachyon, Schult.	6— 8	14—22	Nil	Nil

From the above table it is clear that only a few grasses as *Panicum antidotale*; (The Australian drought-resistant grass) and *Enteropogon monostachyos* (a common forest grass) have high germination reaching 80%. The popular *Cenchrus ciliaris* (Kolukattai) and *Iseilema laxum* (Chengali gaddi) have 35 to 48% germination capacity and the others with less than 25%. The low initial germination percentages noted in most of the grasses is probably made up in nature, by the very large quantity in which they are produced. The poor germination of 8 to 11% noted in *Cenchrus setigerus* (Black Kolukattai) when compared to the 35-39% recorded for *C. ciliaris* may be taken to be the cause for the widespread nature of the second species over the other. Thin Napier *(Pennisetum ploystachyon)* with its low germination (6%) has spread admirably well in West Coast within a few years of its introduction there; this must be due to the prolific bearing which compensates for the low germination. Further, its viability in the second year is higher than in the first year.

Viability on storage: Generally with storage, there is decrease in germination capacity every year. Among the cereals of the temperate regions oats live longest, wheat and barley next and rye and maize have shorter life-spans (3). All the pasture grass seeds tested in England lost their viability between eighth to thirteenth year (1). Most of the tropical millets on the other hand lose their viability after 3 to 4 years after storge (4). The columns 3 to 6 in table 1 gives an idea about the viability of grass seeds in the successive years of storage. Many of the grasses retain their viability in their second year of storage and the deterioration is evident in the third year. Except in a few cases many of them in the fourth year of storage have lost their viability completely.

Special cases: *Panicum antidotale* (Australian drought-resistant grass.)

The trials with this species has shown that they are viable to 60 to 65% after 4 years of storage. The actual data collected are tabulated below.

TABLE II

Viability of Panicum antidotale seeds.

Seed testing done on	Seeds collected in the year	Year of storage	Percentage of germination
24—12—1945	1943	3rd year	61·0
13—3—1946	1945	2nd year	50·0
3— 5—1949	1944	6th	34·0
7— 5—1949	8—4—1949	(1 month)	22·0
26— 5—1949	1948	2nd year	59·5
21— 6—1949	1948	,,	68·0
21— 6—1949	1944	6th year	87·0
5— 7—1949	1948	2nd year	72·0
5— 7—1949	1944	6th year	65·0
30—12—1949	Bulk coll. 1949	1st year	70·0
12— 1—1950	Dec. 1949	(1 month)	55·0

It is seen from the table that the germination percentages upto sixth year of storage has been quite high, from 65 to 87%. This conforms with the results obtained at Australia by Whittet in (1943) (5). Seeds collected and tested by him in July 1939 gave 67% germination. The same tested on September 1943 gave 74%.

This shows that the viability is not reduced after four years storage Whittet further says "*the viability of the seeds of many of the dry weather resistant grasses improve with five to six years of storage and Panicum antidotale may be included in this group.*" The tight-fitting glumes present in this species may aid in the retention of viability. A similar explanation is given by Croker (3) for the high viability of oats and it has been shown that deglumed oats, Proso millet (*Panicum miliaceum*, L) and timothy grains (*Phleum pratense*, L) lose their viability faster than those with the glumes intact.

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Role of the Scutellum in the embryonic growth in corn (Maize)

By

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(Received on 9—5—1950)

In a two-week old embryo of corn, the scutellum almost envelopes the axis. Whether this has any special role in the growth of the embryo is the object of this experiment. The two treatments comprising the experiment included:

(1) The embryo dissected out of the kernel and the scutellum removed under aseptic conditions and kept in Tukey's basic medium to which is added the physiologically active growth-promoting substances (Uttaman, 1949).

(2) The embryo dissected out of the kernel and kept without removal of the scutellum in Tukey's basic medium plus active growth ingredients indicated in (1).

The embryos in both the treatments germinated the next day of placing in the culture medium and the growth appeared to be more or less the same in both. Each treatment was replicated three times. The results of individual growth measurements (given in millimeters) and the average of the three replications under each treatment for each day are entered in the table below:

Days of measurement	Treatment 1 Replications						Average		Treatment 2 Replications						Average	
	1		2		3				1		2		3			
	S	R	S	R	S	R	S	R	S	R	S	R	S	R	S	R
1st day	3·0	—	2·8	—	3·2	—	3 0	—	2·5	—	2·0	—	1·5	—	3·0	—
2nd ,,	7·0	0·5	6·0	0·5	8·0	0·5	7·0	0·5	7·5	9·5	7·0	8·5	6·5	9·0	7·0	9·0
3rd ,,	8·0	1·0	7·0	0 8	9·0	0·9	8·0	0·9	20·2	12·8	20·0	11·4	19·8	11·8	20·0	12·0
4th ,,	8·0	1·0	7·0	1·0	9·0	1·0	8·0	1·0	30·5	13·2	30·0	12·8	29·5	13·0	30·0	13·0
5th ,,	10·0	1·0	9·5	1·0	10·2	1·0	9·9	1·0	30·8	23·6	30·7	23·2	30·6	23·4	30·7	23·4
6th ,,	10·0	1·0	9·5	1·0	10·2	1·0	9·9	1·0	37·0	23·6	36·5	23·2	36·0	23·4	36·5	23·4

It will be seen that the embryo in which the scutellum was not removed (Treatment 2) has the largest growth for both shoot and root. The growth is very tardy and poor in the one in which the scutellum is removed (Treatment 1).

Discussion: Whether the scutellum in the young embryo exercises any special physiological function for the promotion of growth in the young embryo or merely plays a physical role in providing the absorption surface necessary for the supply of nutritive elements to the embryo is a matter for more critical investigation. The large growth for the embryo whose scutellum is not removed, in this experiment, may be attributed either to the one or the other of the two possible functions of the scutellum stated above, or to both. The poor growth of the embryo in which the scutellum was removed may be partly due to the shock sustained by the embryo in the prccess of the removal of the scutellum. But this should not last long and the young growing embryo should be able to get over this shock and continue growth if the scutellum had no vital connection whatsoever with the growth promotion in the young embryo. Hence it seems that the scutellum does play a definitue role in the promotion of embryonic growth.

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Some Experiences with BHC (Gammexane) and DDT.

V. The Cotton and Bhindi Jassid, (Empoasca devastens, D)

By

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&

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(Received 17—5—1950)

Jassids, popularly known as leaf-hoppers, belong to the category of bugs. These are tiny, active wedge-shaped creatures, infesting a variety of cultivated crops. The adults and nymphs are provided with a set of piercing and sucking mouth-parts with which they are able to puncture the tender portions of the plants and suck up the nutrition. The bugs usually occur by millions on their respective hosts and despite their minute size, they are capable of causing an enormous drain of the cell-sap. Over eight species of these jassids have been recorded as crop pests in South India, the more serious forms of which are (1) The paddy jassid (*Nephotettix bipunctatus*, F.), (2) the mango hoppers (*Idiocerus Atkinsoni*, L.) and (3) the cotton jassid (*Empoasca devastens*, D.). The present article is about the last mentioned species.

Previous History: This leaf-hopper has been recorded as a pest of exotic varieties of cotton for over 40 years and its ravages have since been progressively assuming more and more serious proportions. Considerable attention has been devoted to the study of this troublesome insect and a volume of information has since accrued, the bulk of which consists of data on the different species of jassids, their taxonomic characters, their life-history, habits, seasons of occurrence etc.

The more important line of work has, however, centred round breeding strains of cotton resistant to these jassids. The consensus of opinion appears to be that the hairiness of the plant has a direct relation to its resistance to the jassid. But this character itself is reported to be influenced by factors like rainfall, variations in the climatic conditions, soil fertility etc. Special mention has to be made of strain Nos. 2, 3 and 4 of Cambodia cotton evolved and distributed by the Cotton Specialist, Coimbatore, which possess a remarkable degree of resistance if sown in the proper season and followed by favourable weather conditions, adequate irrigation facilities etc. The major factor contributing to the resistance is reported to be the pronounced hairiness of the first four leaves which inhibits the initial infestation and consequently the further multiplication of the jassids. Even these strains, if sown out of season or grown under unfavourable conditions, do get the infestation and suffer, but recover soon after the virulence of the pest subsides, whereas the susceptible types invariably succumb. While it has to be admitted here that the evolution of the insect-resistant strains has gone a long way to solve the problem, the help of pesticides has necessarily to be called in to keep down the damage even in the resistant varieties (if they are unable to exhibit their inherent qualities due to environmental factors). The chemical treatment is indispensable in the case of strains which are not endowed with any degree of immunity.

Pesticides like Nicotine dust and spray, kerosene emulsion, sulphur, Bordeaux mixture, etc. have been given a fair trial. Of these, only the first mentioned two are reported to have given a certain amount of relief. The beneficial results should have been more against the younger stages, since the adults invariably escape the direct hit of the contact insecticides by virtue of their powers of quick flight. Even the little reduction, if any, should have obviously been made up by the subsequent quick breeding of the jassids. The indifferent results of these chemicals are perhaps more obvious from the fact that none of them have since been adopted for the control of these jassids on a field scale. More tangible results have recently been achieved in the Punjab (Rahman 1946). Application of DDT dust mixed with ash at 0·5, 1·0 and 2% concentrations is reported to have caused an entire mortality in the course of 24 hours.

Life-History and Habits: The jassids occur practically throughout the year, but assume serious proportions by December–January. The life-history of the bug is briefly as follows: The female inserts her eggs singly, generally inside leaves, leaf-stalks, veins, young shoots etc. The egg stage lasts from 5 to 15 days and the nymphal period from 10 to 12 days passing through 5 instars. Mating takes place 2 to 16 days after the last moult and the oviposition 2 to 7 days later. The maximum egg-laying capacity of a female is recorded as 29, but the eggs are laid in the course of a fortnight. While this is about the general rule, striking variations have been recorded in the duration of the nymphal stage and the longevity in the Punjab, where extremes of climate are more pronounced. The nymphal period extends to 7 days in autumn, and is prolonged to 21 days during the cold weather. Mated adults live up to 36 days in summer and 48 days during winter. Unmated adults survive for about three months when carefully fed. Certain colour variations also are said to occur during the different seasons, the winter broods being markedly reddish, while the summer ones are greenish yellow.

Host Plants: Exotic and indigenous cottons, brinjal (*Solanum melongena*), bhindi (*Hisbiscus esculentus*), sun-flower (*Helianthus annus*), Hollyhock (*Althea rosea*) and potatoes are the favourite hosts.

Nature and Extent of Damage: Cotton: A severe attack is first indicated by the presence of millions of the hoppers which fly about when the plants are disturbed. The infestation commences during the earlier stages of the crop and reaches the maximum by December-January. More obvious indications are exhibited by the yellowing or reddening of the lower leaves, while the younger leaves at the terminal ends present a crinkled appearance. The growth is retarded and the plants invariably succumb in the case of the susceptible varieties. In the few that survive, flowering is sparse, boll-formation poor and the quantity of the yield poorer.

Bhindi: Of late, these jassids appear to have developed a partiality for this vegetable. They occur almost throughout the year, but the infestation manifests itself to an alarming degree during February—March. The leaves turn yellow and more often get crinkled and cupped. The affected plants remain stunted in growth and ultimately wilt away. But these symptoms should not be confused with those of the virus disease which is altogether a different malady. This disease is transmitted by an *Aleurodid*, (*Bemisia gossypiperida*) and is characterised by the yellowing of the leaves with the peculiar reddish streaks on either side of the veins. With the progress of the disease, the discoloration spreads to all the leaves which eventually fade away. Strange as it may be, that while the complaint is so virulent and destructive, one finds very few of the vectors on the plants themselves. The redeeming feature of the jassid trouble is that the plants recover their normal growth soon after insect factor is eliminated, while those affected by the virus are definitely doomed and the only method of control would be to pull out and destroy the sick-plants so as to prevent the spread of the infestation.

Brinjal: The symptoms of attack in this plant also are evinced by the crinkling and discoloration of the leaves and poor growth of the infested plants.

It has also to be mentioned in this connection, that all the host plants of this jassid are susceptible to virus diseases, transmitted by different insect vectors and that the bug itself even if it occurs on a pest form, is absolutely innocent of this more serious and incurable malady.

Work Done: A serious incidence of the pest almost threatening the wholesale ruin of some experimental work on bhindi, was reported during September 1948 from the Millet Breeding Station. Trials were undertaken with the recently available formulations DDT, BHC and and Hexa-ethyltetra-phosphate (H. E. T. P.) as sprays at 0 1, 0·1 and 0·05% strengths respectively. H. E. T. P. and DDT caused an appreciable mortality, while BHC was practically inert. Subsequent trials conducted more on an exploratory basis against the same pest on cotton during December 1948, confirmed the specific action of DDT as spray at 0·1%. The studies were pursued during 1949 on bhindi at the Central Farm, Coimbatore, the variants being DDT 3 and 5%, BHC 5% dust, DDT spray at 0·1% and of BHC at 0.05%. The data on the initial population, the percentage of reduction 24 hours after treatment as well as the yields were gathered and a gist of the same is furnished in statement No. 1.

The following are the broad conclusions available from these figures.

1. Between DDT and BHC, the former appears to have a specific action against the jassid both as dust and spray;
2. The spray at 0·1% is more economical and efficient, the cost being Rs. 5—8—0 per acre per treatment;
3. The yield of the treated plots appreciated by 28% as a result of the elimination of the jassid;
4. The pest being mild at the time of the observations, the difference in the yield has not been sufficiently striking. Exploratory trials conducted during the months of February to April when the jassid was more virulent, indicated additional yields ranging from 120 to 380% over the control for the same treatment.

Similar trials were conducted against the same leaf-hopper on brinjals and the percentages of reduction in the population are given in this case also.

The experiments were continued with DDT 2% and 5% dusts and sprays at 0·1% and 0·05% against the same jassid on cotton at the Cotton Breeding Station during December 1949 and a gist of the results is furnished in statement III.

The data indicate the very high mortality caused by the DDT dust and spray and the latter being quite efficient even at 0·05%. The cost of the treatment works to Rs. 4-2-0 per acre.

The results of Hexa-ethyl-tetra-phosphate (H. E. T. P.) are equally promising and it is proposed to develop the use of this chemical further.

Residual Effects: Small plots severely attacked and situated in the middle of a badly infested field were treated with the dusts and sprays mentioned above and the progress of the jassids observed. The treated plants were free for 10 days, after which an appreciable number of the jassids were found breeding on these plants. This gives us a broad indication that the residual effects of DDT last for about 10 days in the field.

It has to be mentioned here that though the availability of DDT and BHC has been a blessing by itself, certain untoward effects are likely to be experienced in the actual use of these chemicals on a field scale. The treated plants invariably get a heavy infestation of mites and sometimes of aphids as well. The secondary infestation can be attributed to the probable lethal action of the insecticides on the parasites and predators, which usually exert a natural check on the undue multiplication of these pests. The control of these insects is a simple affair, but a note of warning has to be sounded against the indiscriminate use of the chemicals, especially on crops, which are susceptible to infestation by mites, aphids etc.

The kind help and facilities rendered by the Cotton Specialist, Superintendent, Central Farm and the Millet Specialist are gratefully acknowledged.

STATEMENT—I.

Results of trials against the Jassid (Empoasca devastens) on Bhindi.

Locality: Central Farm, Coimbatore
Lay-out: Randomised plots replicated four times
Number of treatments: Six
Size of plot: 0·6 cents per replication per treatment

Treatments	Jassid population on 5 leaves			Yield per acre in lbs.	% increase of yield over control	Cost of treatment per acre		
	Before treatment.	24 hours after treatment	% reduction in population			Rs.	A.	P.
DDT 3% dust ...	44	7	84	1,043	29	17	8	0
DDT 5% dust ...	55	6	89	898	10	21	14	0
DDT 0·1% spray ...	42	3	93	1,038	28	5	8	0
BHC 5% dust ...	51	23	55	818	nil	10	5	0
BHC 0·5% spray ...	45	48	nil	895	10	12	11	0
Control ...	60	40	33	813	...		...	

STATEMENT—II.

Results of trials against the Jassid (Empoasca devastens) on Brinjal.

Locality : Ryots' field at Tudiyalur
Layout : Randomised plots replicated four times
Size of plot : 2 cents per replication per treatment

Treatments	Jassid population on 20 leaves				Cost of treatment per acre		
	Before treatment	24 hrs. after treatment	% reduction in population	72 hrs. after treatment	Rs.	A.	P.
DDT 5% dust ...	177	45	74·5	15	15	0	0
DDT 0·1% spray ...	436	62	85·7	45	6	0	0
BHC 5% dust ...	328	162	50·6	198	9	0	0
BHC 0·1% spray ...	334	225	32·6	120	17	0	0
Control ...	541	576	nil	334	...		

STATEMENT—III.

Results of trials against the Jassid (Empoasca devastens) on Cotton

Locality : Cotton Breeding Station, Coimbatore
Lay–out : Randomised plots replicated two times
Number of treatments : Six
Size of plot : 2½ cents per replication per treatment

Jassid population on 10 leaves.

Treatments	Initial counts		24 hours after treatment		48 hours after treatment		% reduction in population after 48 hours.		5 days after treatment		10 days after treatment		Cost of treatment per acre		
	A.	N.	A.	N.	A.	N.	A.	N.	A.	N.	A.	N.	Rs.	A.	P.
DDT 2% dust ...	62	62	2	7	2	4	96	93	4	...	28	10	17	8	0
,, ·5% ,, ...	51	90	...	4	...	4	100	96	...	3	20	...	25	0	0
,, ·1% spray ...	51	86	...	6	1	3	98	96	1	...	15	...	8	4	0
,, ·05% spray ...	49	93	...	4	1	3	99	97	1	...	28	...	4	2	0
HETP ·1% spray ...	20	34	1	1	1	2	95	94	2	...	18	14	7	8	0
Control ...	32	17	35	16	33	19	...	...	40	31	42	18	...		

A. Adult ; N. Nymph.

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Paddy-Stem Borer Pest: Of the diseases that affect the paddy in the State, the paddy-stem-borer is of the worst type. If the damage done by pests on any crop is computed for the whole world, this insect will perhaps top the list. In South India the pest is present all through the year but varies in intensity of infestation during the different seasons. To get rid of this disease, the possibility of an easy insecticidal treatment of the pest-affected crops was investigated. Experiments carried out by giving the seedlings before transplanting, a dip in D.D.T. water suspension at a strength of 1 lb. of 50 per cent D.D.T. in 40 gallons of water, resulted in success. The treated fields showed a complete absence of white ears.

Successful control of Rat: The rat is another bug-bear to the agriculturists. Various measures have been undertaken to put an end to the endless trouble the rat has been causing. Experiments were conducted by the Agricultural Department in their farms to get rid of the trouble. By regular adoption of various measures early in the season, such as cyno gassing, digging out of the burrows, hunting the foraging pests at nights with lights and sticks and baiting with bow traps and Zinc phosphide, the rat problem of the current Fasli has been practically solved. But, however, because of its cheapness, zinc phosphide has caught the ryot square in the eye.

Preservation of Jaggery: In the East Godavari an excellent type of godown for preserving jaggery is developed. The jaggery godowns are owned by some merchants and few cultivators. A brief description of a godown built by a co-operative society, is given below:

The jaggery godown is a well-built rectangular brick structure with a sloping roof. All round the building, a gutter like channel about 6" wide is built at the plinth level and filled with water to prevent ingress of ants. Inside the building three attics are constructed with bamboos. The lowermost tier will be 7' above floor level and the third tier is again 5' above the 2nd. A fourth tier also is improvised by building one other platform flush with the tops of the godown walls. In these platforms, built at different levels, small openings are left for taking jaggery up and down. The godown has 8 rooms, each with a floor space of 18' x 10'. Jaggery is packed in cane trash and put in palmyrah leaf baskets and tied with palmyrah ribbons. Net weight of the jaggery in each basket will be 60 lbs. Three hundred such baskets are stored on each tier in each room or partition. Therefore 3 x 300 baskets will be stored on the regular tiers and 200 more can be put in the top-most improvised tier. Thus 1100 baskets can be stored in each room or 8800 baskets in the entire godown. Hence a maximum of about 236 tons of jaggery can be stored per season in this store house. A sum of Rs. 0—5—6 is charged per season (a calender year or less). Jaggery manufactured from February to April is the best for storage.

The consistency of the jaggery is kept up by periodical 'smoking'. On the ground floor paddy husk is spread and set fire to. The door and window shutters are closed and smoke made to spread through all tiers. During summer months i.e., till the end of May only two smokings are given. If there is rain one more smoking is done. During this period, 10 bags of husks are spread in each room for each smoking. In the monsoon months smoking is done once in about 15 days depending upon the rains. During this period 14 or 15 bags of paddy husk per room are apread each time. On the whole 14 or 15 smokings are given per year if the jaggery is kept in the room through out. If part of the stock is sold, less amount of paddy husk is needed for burning. The men in charge of the godown have to use their discretion at every stage. Previous researches on this storage of gur disclosed that there should be about 60% relative humidity in the godown for jaggery to keep well.

An Alternate Food Crop for the Nilgiris: Experiments carried on at the Agricultural Research Station, Nanjanad disclosed that for cultivation under climatic conditions of Nilgiris district one of the exotic crops is Buck wheat. Buck wheat is a quick growing plant and comes to maturity within 4 months and can be successfully raised the whole year round, except the cold weather months of November—January when the weather is dry. In soils of fairly rich manurial content, it attains a height of nearly 2 feet and spreads to a diameter of over 2 feet. Thus it is a very good soil binder and prevents loss of soil even during heavy rainfall. It is a deep rooted crop; not easily damaged by wind. It can also be used as a green manure crop, as it yields a tonnage of over 10,000 lbs. of green matter per acre. Due to its spreading nature it smothers weed growth and checks the spread of weed. Like Kolinji in the dry lands of the plains it produces a self-sown crop when once it is cultivated in a field.

The immediate importance of this crop is due to the fact that its grains are edible and form an excellent substitute for wheat or any other flour and can be utilised for making bread, cakes and biscuits. 200-300 lbs. of seeds can easily be obtained from an acre; and as it is not a rationed article It is not procured for consumption. The entire produce can be made use of for family consumption and should go a long way to supplement the ration supplied. This crop is being appreciated by local ryots.

Septobasidum on Lime Trees: In-several lime gardens of West Godavari district a felt like fungal growth caused by *septobasidum* was noticed on the twigs. The effect of this infestation is to cause the slow drying of the affected twigs. This can be easily controlled by spraying the bushes with Bordeaux mixture to which crude oil emulsion has been added. This combination keeps down the insects and the fungus. A few days after the application of the spray the fungus felt comes off in flakes or dins up and the insects disappear. The sprayed bushes improve in condition. The benefits of spraying have been realised by the growers who want to adopt this treatment regularly.

Cashew Apple Syrup: Experiments conducted at the Government Fruit Products Research Laboratory, Kodur have shown that a palatable and healthful fruit drink can be prepared from the Cashew apples. If the cashew apple juice is treated with lime juice or citric acid much of the astringency that is present in the cashew apple can be removed. After the addition of lime or citric acid the cashew apple juice should be allowed to settle overnight. The supernatant juice is then mixed with sugar and converted in cashew apple syrup or cordial and preserved with potasium metabisulphate.

Uganda 1 Cotton in our plan for Self-Sufficiency: Uganda, 1 the improved cambodia cotton strain was planted in area of 102 acres in the taluk of Coimbatore during 1949-50 season. Seeds were supplied by the Department and raised in 15 different holdings between 1st and 30th of September 1949. The progress of the crop was watched and it is very interesting to observe that Uganda 1 was very early, retentive of bolls and with good boll opening and fine long staple. The contrast was more when compared to the local old, strains viz., Co. 2 or 4563. The year being a droughty year for the 3rd time in succession, water stress was great and growing of an early strain in this taluk is of great economic value to farmers. Uganda 1 can be confidentally recommended to replace B 463 or Co. 2 or any other local variety grown in Coimbatore taluk. The advantage of growing an early strain is all the more greater for growing chitrai cholam immediately after cambodia cotton like Uganda 1. The quality of Uganda 1 needs no repetition as it is considered equivalent to imported South African, advantageous to the ryots but also desirable for the nation's economy and self-sufficiency in Long Staple requirement.

Artificial Insemination of Cattle: 65 cows were artificially inseminated at the Madras Centre in the Madras Veterinary college. An additional Artificial Insemination centre was opened at the Veterinary Hospital, Coimbatore on 7th February 1950 and one more will be started at Veterinary Hospital, Guntur shortly. 28 inseminations were done at Coimbatore during February 1950.

Cattle Farms: Livestock Farm for the Malabar district has been sanctioned by the Government. Preliminary work on the farm is in progress.

Scheme for Assistance to Private Cattle Breeders: A scheme for the grant of subsidy and loans to private cattle breeders has been sanctioned by the Government.

Weather Review — For June 1950

RAINFALL DATA

Division	Station	Total for the month in inches	Departure from normal in inches	Total since January 1st in inches	Division	Station	Total for the month in inches	Departure from normal in inches	Total since January 1st in inches
Orissa & Circars.	Gopalpore	8·7	+3·2	17·7	Central—*Contd.*	Coimbatore	0·9	—0·6	4·2
	Calingapatnam	3·7	—1·0	9·3		Tiruchirapalli	0·1	—1·7	6·2
	Vizagapatnam	3·3	—0·8	6·1	South.	Negapattinam	0·1	—1·1	8·0
	Anakapalle*	6·5	+3·3	8·8		Aduturai*	1·0	—0·1	7·4
	Samalkot*	2·1	—2·7	6·6		Pattukottai*	0·2	—0·8	8·3
	Kakinada	2·5	—2 2	5·2		Mathurai	Nil	—1·6	7·5
	Maruteru	2·2	—1·7	6·7		Pamban	Nil	—0·2	7·4
	Masulipatnam	2·3	—1·9	7·1		Koilpatti*	Nil	—0·5	10·1
	Guntur*	4·6	+0·6	8·5		Palayamcottai	0·2	—0·2	10·9
	Agrl. College, Bapatla*	2·4	+0·2	5·7		Ambasamudram*	0·9	—0·6	12·6
	Veeravanam* (College Farm)		(x)		West Coast.				
	Rentichintala	1·5	—2·1	3·9		Trivandrum	7·7	—5·5	24·4
Ceded Dists.						Fort Cochin	26·9	—1·6	51·3
	Kurnool	6·2	+3 3	8·5		Kozhikode	28·3	—6·5	44·0
	Nandyal*	4·1	+0·6	5·2		Pattambi*	59 3	+32·3	85·1
	Hagari*	4·1	+2·4	5·7		Taliparamba*			
	Siruguppa*	2·9	-0·6(a)	3·6		Nileshwar*	39·2	—4·2	49·9
	Bellary	3·0	+1·3	4·0		Pilicode*	35·6	-7·3 @	44·5
	Cuddapah	0·3	—2·7	2·5		Mangalore	43·6	—3·4	48·2
	Kodur*	0·3	—2·3	2·5		Kankanady*	54·6	+15·4	60·1
					Mysore & Coorg.				
Carnatic.	Nellore	1·4	+0·1	2·9		Chitaldrug	1·5	—1·1	4·9
	Buchireddipalem*	0·8				Bangalore	1·1	—1·8	5·1
						Mysore	1·5	—1·0	11·4
	Madras (Meenambakkam)	2·1	+0·3	5·7		Mercara	19·8	—5·7	24·6
	Tirurkuppam*	1·6	-1·3 @	4·1	Hills.	Kodaikanal	1·3	—2·9	12·8
	Palur*	1·7	+0·3	6·2		Coonoor*	1·4	—1·9	15·4
	Tindivanam*	0·3	—1·8	4·9		Ootacamund*	2·0	—2·8	7·0
	Cuddalore	1·3	—0·1	5·9		Nanjanad*	4·3	—3·2	12·1
Central.	Vellore	0·2	—0·1	2·3					
	Gudiyatham*	0·1	—2·6	2·0					
	Salem	2·9	—0·2	6·2					
	Coimbatore (A. C. R. I.)*	0·9	—0·6	4·6					
	Coimbatore (C. B. S.)*	0·9	—0·6	4·9					

Note:— (1) * Meteorological Stations of the Madras Agricultural Department.

(2) Average of ten years data is taken as the normal.

(3) (x) Readings are recorded only from February, 1948.

(4) @ Average of seven years data for Tirurkuppam and eight years data for Pilicode is given as normal.

(5) (a) Taluk office normal is 3·0″ and Rainfall is 0·81″.

Weather Review for June, 1950.

During the first seven days in the month the monsoon continued to be active along the West Coast, though the pressure changes were not favourable for its extension towards north. Thereafter for a week it was unsteady. On 14—6—1950 it became strong and remained so for a week. It became feeble on 21—6—1950 but gained activity during the subsequent three days. It was weak again till the end of the month, barring, ofcourse, the slight improvement in the development on 26—6—1950.

Monsoonish weather prevailed practically throughout the Presidency; but there were also periodical spells of dry weather. The day temperatures have been below normal particularly in the coastal districts.

The development of the moonsoon along the West Coast in the month under report is not, on the whole, satisfactory. However, the following hopeful forecast has been published by the Regional Director in charge of Madras Meteorological Observatoties in his report dated 10—6—1950.

Summary of Monsoon forecast: June to September, 1950.

"The monsoon rainfall of June to September 1950 is likely to be normal or slightly below normal in the Pensisula and not far from normal in North West India, Jammu and Kashmir and Rajasthan."

The noteworthy falls received in the month are furnished below:—

S. No.	Date	Place	Rainfall in inches
1.	1—6—1950	Alleppey	2·9
2.	2—6—1950	Manglore	7·8
3.	,,	Kozhikode	5·2
4.	,,	Palghat	3·0
5.	14—6—1950	Fort Cochin	5·1
6.	16—6—1950	Salem	1·7
7.	23—6—1950	Manglore	7·3
8.	25—6—1950	Bellary	2·0

Agricultural Meteorology Section,
Lawley Road Post, Coimbatore
Dated, 15—7—1950

M. B. V. N., C. B. M. & M. V. J.

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Sri Balasundaram, S.—A. D. Atmakur; Balasubramaniam, T. V. — A. D. Peravurni; Naghabushanam, K. — F. M. A. R. S. Siruguppa; Nagarajan, C. — Asst. in Cotton, Coimbatore; Ramalinga Chetty, P. — A. A. D. Chandragiri; Rama Rao, K. — A. D. Punganur; Rajagopalan, B. V. — A. D. Mannargudi; Sivarama Sastri, S. V. — F. M. Agrl. College, Bapatla; Santhanam, S R. — A. D. Avanashi; Thiruvenkatachariar, T. E.—A. D. Kalladakurichi.

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In view of the high cost of printing contributions should be as concise as possible and should conform to the best usage in the leading Journals published in India and abroad.

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